

ERASMUS MUNDUS MASTER PROGRAMME IN SOIL SCIENCE – emiSS

2020-2021 ACADEMIC YEAR - MODULE SYLLABUS

Name of course:	
<i>TOXIC SUBSTANCES IN FOOD</i>	
ECTS	6
Type of Course	<i>Elective</i>
Form of Examination	<i>Written Examination</i>
Prerequisites	<i>Basic knowledge in the chemistry, agricultural and environmental science.</i>

Field of Study:	
<i>Agriculture</i>	
Education profile	<i>Academic</i>
Code of study form and level of education	<i>Master of Science</i>
Academic year/Semester	<i>First year/Spring Semester</i>
Specialization	<i>Agriculture</i>
Language of education	<i>English</i>

The lecturer module:	
The name of faculty	<i>Agricultural Univ. Faculty of Plant protection and Agroecology</i>
The name of department	<i>General Chemistry</i>

Educational outcomes:	
Description of the learning effect	
KNOWLEDGE - student knows and understands:	
1	<i>Student knows to evaluate the sources, nature and control of toxic substances in human food system</i>
2	<i>Student knows to evaluate the toxic substances in food and the methods for their quantitative and qualitative analysis</i>
3	<i>Student knows the European and national standards related to toxic substances in food</i>

SKILLS - the graduate can	
1	<i>Student obtains the necessary scientific information from literature, databases or other sources</i>
2	<i>Student shows the ability to correctly interpret results and draw conclusions food safety analyses.</i>



SOCIAL COMPETENCES - graduate:

1	<i>Student shows activity during a discussion on various issues related to toxic substances in food analysis</i>
2	<i>Student has the competence to participate in food chemistry research for toxic substances and discuss their results</i>

Course objectives and content:

The course "Toxic substances in food" is intended to acquaint students with the toxic substances contained in food - heavy metals, monocyclic aromatic compounds such as phenols and phenolic derivatives, polycyclic aromatic compounds, biphenyls, dioxins, herbicides, insecticides and pesticides, antibiotics, growth hormones. The course will also address the substance toxicity and metabolism in humans, which give a clear and complete picture of their adverse effects on human health, and will be a description of these effects (mutagenic, teratogenic or carcinogenic). During the seminars, students will learn methods for analysis of toxic substances in food.

Toxic Substances in Food

36 hours

Subject of lecture	1	<i>Contaminants in food - classification and toxicity characteristics. Methods to assess toxicity 3 h</i>
	2	<i>Toxic substances of natural (plant and animal) origin) 2 h</i>
	3	<i>Heavy metals in food (lead, arsenic, cadmium, mercury). Sources and dynamics 4 h</i>
	4	<i>Monocyclic aromatic compounds (phenols, chlorophenols and nitrophenols) and polycyclic aromatic compounds (anthracene, phenanthrene and naphthalene). Toxicity. Metabolism in humans 3 h</i>
	5	<i>Polychlorinated biphenyls and dioxins. Toxicity. Metabolism in humans 3 h</i>
	6	<i>Insecticides, fungicides and herbicides. Toxicity. Metabolism in humans 3 h</i>
	7	<i>Midterm exam</i>
	8	<i>Antibiotics and growth hormones. Toxicity. Metabolism in humans 3 h</i>
	9	<i>Genetically modified plants and their impact on human health 3 h</i>
	10	<i>Genetically modified animals and their impact on human health 3 h</i>
	11	<i>Safety in food storage. Packaging and other materials in contact with food - Problems and solutions 3 h</i>
	12	<i>Food analysis for heavy metals content (atomic absorption and atomic emission analysis) and pesticides (liquid chromatography) 3 h</i>
	13	<i>Standards and regulations. Legal Documents for the content of toxic substances in foods 3 h</i>
	14	<i>Final exam</i>



The methods of verification and assessment criteria and principles	<i>For a positive grade: student should receive at least grade 4 on midterm exam and for final exams score should be greater than 4 (excellent is 6).</i>
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Literature:	
Recommended Textbooks	1- Greenfiled H., Southgate D. A. 2003. <i>Food composition data</i> . FAO, Infoods, Rome, 2003. 2- EFSA (European Food Safety Authority).2006. <i>Tolerable Intake Levels for Vitamins and Minerals.</i> , 2006. 3- Lawley, R., Curtis. L., Judy Davis, J. 2012.. <i>Chemical Hazards in Food, Food Safety Info, e-book (PDF format).</i> , ISBN: 978-0-9572993-1-3 4- Shibamoto, T. L., Bjeldanes, L.F. 2009. <i>Introduction to Food Toxicology (Second edition, 2009)</i> , T. Shibamoto, L. F. Bjeldanes (Available from online booksellers)
Complementary	<i>Current publications in scientific journals related to course issues and some course materials supported by lecturer.</i>

Structure of learning outcomes:

The area of study: chemistry, agricultural, environmental science, natural resources **6 ECTS***

The structure of student activity:

<i>Learning Activities</i>	<i>Amount</i>	<i>Time (h)</i>	<i>Total work-load (h)</i>
Participate in lecture	12	3	36
Participate in midterm exam	1	2	2
Individual study for midterm exam	6	3	18
Individual study for lectures	12	1	12
Laboratory study	10	2	20
Quiz			
Assignment	10	2	20
Participate in final exam	1	2	2
Individual study for final exam	6	3	18
Literature critical review			
Oral exam			
Individual study for problem solution	11	2	22
Consultations			
Participate in researches			
Mandatory practices and internships			



	<i>Total workload (h)</i>	<i>150</i>
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*ECTS Credits = Total Workload (Hours) / 25 (Hours/1 ECTS) = 150 / 25 = 6 ECTS

Name Surname
of Lecturer: Violina Angelova

Sign:.....

Date: 16.01.2020